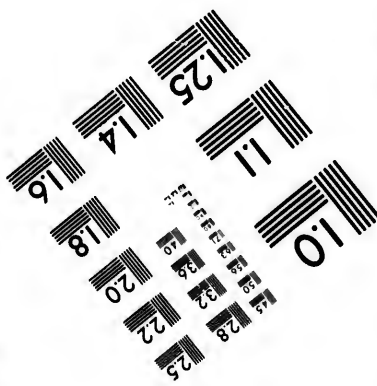
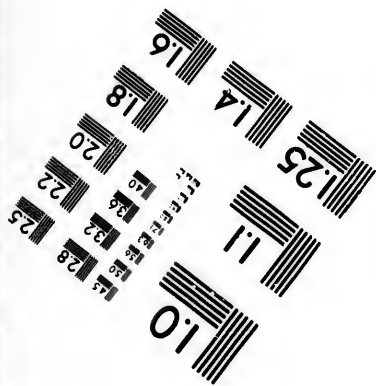
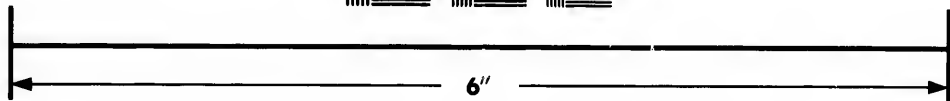
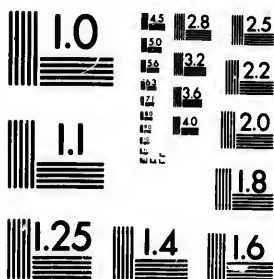


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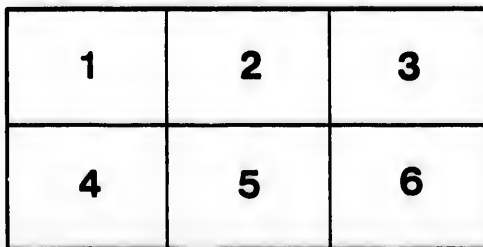
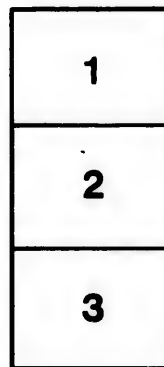
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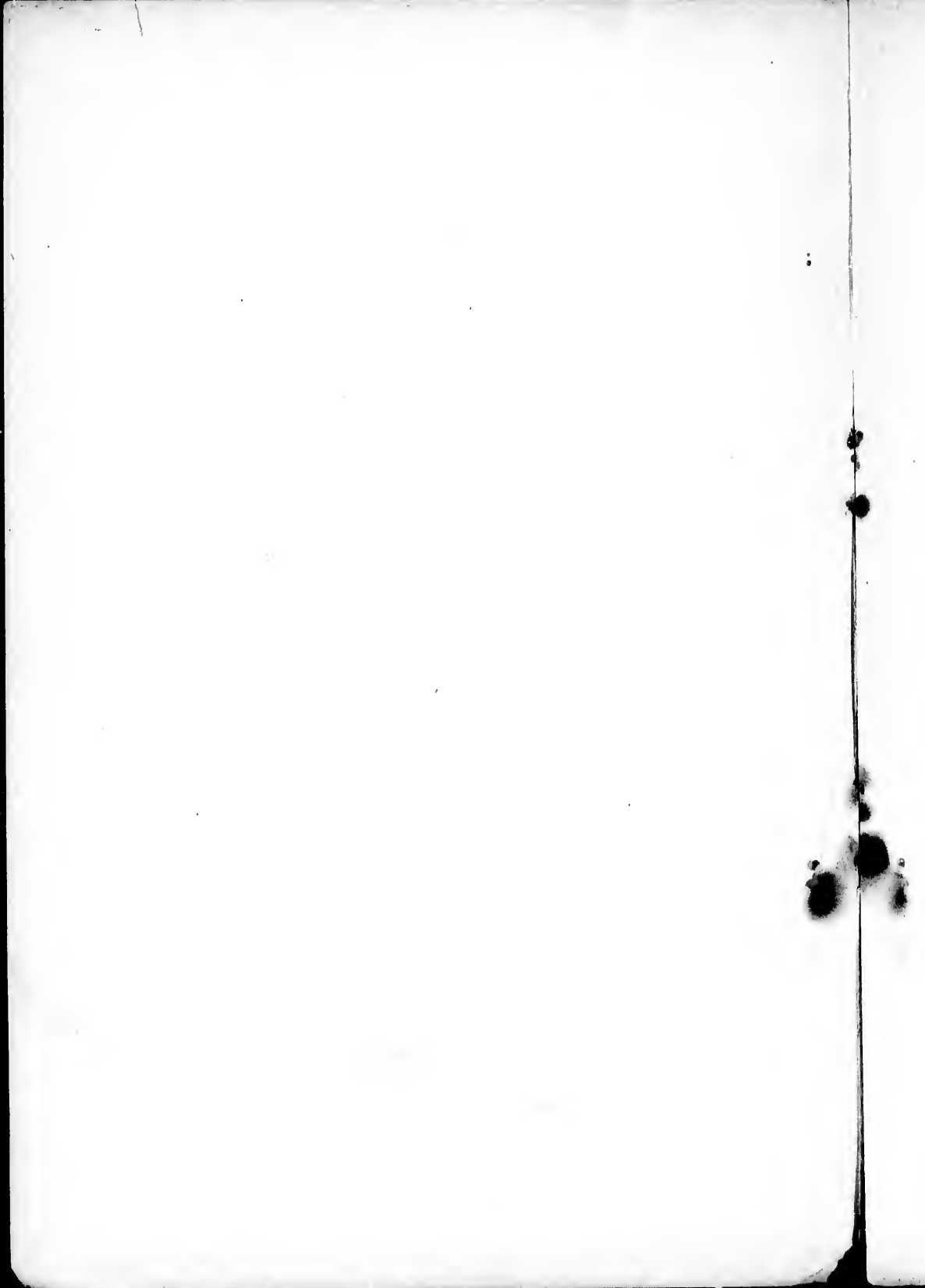
**INTRODUCTORY LECTURE ON HYGIENE, PUBLIC
HEALTH AND PREVENTIVE MEDICINE.**

BY

ROBERT CRAIK, M.D., LL.D.,

Dean of the Faculty of Medicine, Professor of Hygiene, McGill University.

Reprinted from the Montreal Medical Journal, November, 1896.



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In beginning the study of a new subject, it is always well to obtain as clear a view as possible of the field which is to be explored and cultivated; its scope, its limitations, its possibilities and the nature of the work which is to be performed in it; and the more clearly these are understood at the beginning, the more intelligently and successfully will the work be carried on.

In entering, therefore, upon our reorganized course of Hygiene, I have thought it well to devote a short lecture to a survey of the ground to be covered, and an outline of the manner in which we propose to utilize it.

It is impossible in a single word or sentence to define what Hygiene is, or what are its scope and its limitations. The word itself means *health*, or things pertaining to health, being derived from the name of the Greek Goddess of Health, Hygeia, and in its widest sense, therefore the study of Hygiene means the study of all things pertaining to health, whether beneficial or detrimental. This, of course, includes the study of Disease, which is strictly a department of Hygiene on account of the effect which disease has upon health. But the *Science of Medicine* has long since claimed as its own particular province, the study of Disease, and Hygiene has been glad largely to concede the claim, having still an ample territory over which there can be no dispute. But there is also a large area which is common to both, and over which neither can claim exclusive jurisdiction.

Health and Disease may be looked upon as the antithesis of each other, having much the same relations as light and darkness, pleasure and pain, good and evil. But opposite as these things may seem to be, we cannot in our minds disassociate them, for light would scarcely be realized as light if we were ignorant of darkness, pleasure would scarcely be so enjoyable if we had never felt pain, and we could scarcely fix a standard of health, if it were not possible to contrast it with disease.

In this way the study of Medicine and the study of Hygiene meet and overlap each other; the one cannot properly be understood without some knowledge of the other; the Physician in studying Disease fixes his attention upon those points in which it differs from Health, while the Hygienist, in adjusting his standard of Health, must be able to recognize the signs and symptoms which indicate Disease.

This common ground of study between the Physician and the Hygienist or Sanitarian, instead of producing antagonism or divergence, really binds them together, the studies of the one passing imperceptibly into those of the other, so that every Physician becomes more or less a Hygienist, and nearly every Hygienist becomes, or at least qualifies himself to be a Physician. Both are working to rid the world as much as possible of Disease, but while the Science of Medicine aims both at the prevention and cure of Disease, the Science of Hygiene occupies itself almost wholly with its prevention; and inasmuch as prevention is always better than cure, Hygiene as a part of Medicine is assisting in the noblest part of its work.

It may be said therefore, that the peculiar province of Hygiene is,—the study and practice of all those means that tend to preserve and to improve health, and to prevent disease.

In its most comprehensive sense it includes all living things, but in its usual restricted sense it applies more particularly to the human race, with its subdivisions into states or nations, provinces, communities, families and individuals; a common sub-division of the subject being into: (*a*) private or individual Hygiene; (*b*) public Hygiene and (*c*) international Hygiene.

In its highest sense also, Hygiene concerns itself not only with the physical health of individuals and communities, but also with their mental, moral and even their political health.

We have seen that the functions of the sanitarian and of the physician, though having much in common, differ chiefly in that the one studies health and endeavours to preserve it, while the other studies disease and endeavours to cure it, and their relative spheres of action seem tolerably well defined.

But though in the abstract, health and disease seem to be almost the opposite of each other, in practice they are found often to shade almost insensibly into each other, making it difficult to tell where the one ends and the other begins, and making it impossible to give an exact scientific definition of either of them. Perhaps the simplest definitions are,—that health means that condition in which all the functions are performed naturally, while disease means a condition in which at least some of the functions are more or less unnatural. In these definitions, of course the whole difference turns upon what is to be understood as natural or unnatural, and how are we to decide as to what is natural ?

We shall probably find the nearest approach to it in the average course of existence of individuals in a prosperous community. They spring from a healthy parentage ; they are born at full time ; they grow to healthy maturity ; they produce healthy off-spring ; they gradually fade and wither ; they die peacefully and return harmlessly to dust.

But disease may alter all this ; parentage may be unwholesome or depraved ; birth may be difficult or untimely ; growth may be irregular or stunted ; progeny may be misshapen or feeble, or may be wanting altogether ; age may be laden with infirmities ; death may come at any time in a virulent and painful form ; and even the lifeless clay by reason of its virulence may spread pestilence and death among thousands of innocent victims. How different the pictures. Health represents peace, happiness and prosperity ;—disease represents grief, misery and disaster.

What nobler work, then, than to strive to blot out the latter, and to develop the former to still greater excellence ?

But, it may be asked, how far is it possible to exterminate disease and to replace it by health and soundness. Theoretically it ought to be possible to exterminate disease, inasmuch as it is an unnatural condition, and by strict obedience to natural laws, it ought to be made to disappear. But natural laws, like all other laws, are constantly broken ; and indeed anything like perfect obedience to them is scarcely to be expected. They are often imperfectly understood, and when understood they are often beyond our control, and only a partial success in our work can therefore ever be looked for.

But though we can never hope to completely eradicate all diseases, we may confidently expect to exterminate a large number of them, and to so modify and control a still greater number, as to render them comparatively harmless, thus reducing the sum total of misery and mortality in a very important degree. In proof of this we have

only to think of what vaccination has done for smallpox, what anti-toxin is now doing for diphtheria, what improved sanitary measures have done for typhus fever, for scurvy, and for preventing the spread of cholera and other epidemics ; and in Sanitary Science, as in the other Sciences, it seems impossible to limit the extent to which progress and improvement are to be carried.

And how have these successes been achieved ? By carefully studying the laws of Health and the natural (or unnatural) history of Disease, and by applying for their elucidation the modern methods of scientific investigation.

Physiology teaches that in an ideal state of health, in adult life, the metabolism of the tissues and organs is perfect : that the processes of waste and regeneration exactly balance each other, and that to maintain this balance, the ingesta and excreta must be in corresponding proportion. Were it possible in a healthy body, and with pure materials, always to maintain this equality, it would seem that the process should go on indefinitely, and that something approaching immortality should result ; but with our earthly environment no such perfection is possible ; under the most favourable circumstances the metabolism is only approximately perfect, the materials are only approximately pure, and almost from the beginning, a process of gradual deterioration commences, which, aided by other influences, ultimately ends in degeneration and death, and this without the supervention of what can properly be called Disease, but only as the result of processes rendered imperfect by complex disturbing forces which pervade our whole surroundings.

As I have said, this process is not Disease. There is nothing unnatural about it ; it is common to all living things with which we are acquainted, and when it ends in the usual way, we say death has resulted from natural causes or from natural decay ; indeed we are constrained to accept this result as the nearest approach to perfect Health which is attainable in this world. It is in short the natural or normal condition of all earthly living things.

If then we are to accept this as our type of Health, what is Disease supposed to be ? It must at least be something appreciably different, either in degree or in quality ; something added, something taken away, or something altered and perverted. A change sufficient to convert a natural or normal process into one which is measurably unnatural or abnormal.

It is the function of the Sanitarian by all means in his power to *prevent* these changes. When the changes have occurred it becomes the function of the physician to endeavour to remove or counteract them and restore the processes to their natural or normal condition.

But to be in a position to prevent Disease, the Sanitarian must endeavour to ascertain its causes, and the manner in which these causes react upon the organism in producing Disease.

As Health is dependent upon the maintenance of a proper balance between all the functions, and an adequate supply of pure materials to repair the constant waste, and maintain the healthy integrity of the tissues and organs, we naturally look for the causes of Disease among those circumstances likely to disturb this balance, or to vitiate or destroy this healthy integrity of structure.

The causes of Disease, however varied and numerous, may virtually all be said to act by interfering with or vitiating healthy nutrition. Most of them are connected with the ingesta and find entry to the system along with them, being either normal ingredients in improper proportion, or foreign substances abnormally mingled with them. Such causes are to be met with in the air we breathe, in the food we eat, and in the fluids we drink. Certain other active causes find entrance through wounds or abrasions, and still other causes and influences react upon the body from without, such as changes of temperature or of atmospheric pressure, physical and mental exhaustion, &c.

Among all these causes of Disease none have of late years attracted so much attention as those connected with the so-called Germ Theory. The class of Infectious or Zymotic Diseases, with others analogous to them, having been shown to depend upon specific organisms or germs for their origin and propagation, the study of these organisms in all their relations to disease has distinctly been brought within the province of Sanitary Science.

The constantly improving processes of Chemical and Physical research are also being daily brought more and more into the work of Sanitary investigation, more particularly with reference to air and ventilation, water and other beverages, and food with its adulterations. In like manner some knowledge of Architecture and Engineering, as applied not only to private dwellings, but to hospitals, schools, prisons and other public buildings, as well as to systems of drainage and other matters, is every day becoming more imperative.

There are many other directions in which Sanitary Science is extending its boundaries, and the area over which it is exercising control is daily widening in all matters in which the health of individuals and communities is concerned.

The hitherto prevailing system of the Unification of Sanitary Science is therefore no longer adequate to its requirements. No single teacher, however versatile and accomplished, can longer hope to do even moderate justice to so extensive a subject; but thanks to the generous endowment of this Department by our Chancellor, Sir

Donald A. Smith, we are at last able to extend the scope of its teaching in a degree commensurate with its importance, and to give to it that Composite character which the diversity of its interests demands. We have been able to secure for Hygiene the active co-operation of workers in other Departments of the Faculty. Dr. Ruttan, Professor of Practical Chemistry, who has been associated with me for several years, will still further extend the work in Sanitary Chemistry and Physics, more particularly in connection with water, soil, food and air; while Dr. Adami, Professor of Pathology, and Dr. Wyatt Johnston, Lecturer in Bacteriology and Medico-Legal Pathology, will contribute a very complete course of instruction in Bacteriology in its relations with Preventive Medicine. This part of the course will include the Biology of the Bacteria, methods of culture, staining and sterilization, bacteriological examination of water, air, soil and animal fluids and secretions, antiseptics of wounds, Serum Therapy, Epidemiology, disinfection, quarantine, &c.

Ample means of illustration, with Microscopic and Laboratory facilities will be available in every part of the course; and to make the means of illustration still more effective, an extensive working museum of models, specimens, diagrams and Sanitary apparatus of every kind is being prepared, and will add greatly to the efficiency of the course.

It is hoped also that a portion of the Lectures on Architecture and Engineering in the Faculty of Applied Science may, by suitable reciprocal arrangements, soon be made available for students in Hygiene.

In thus expanding the course and providing for additional study in many directions, care has been taken in the interest of the students, not unnecessarily nor unduly to increase their labour; for much of the additional work will be utilized in other Departments, chiefly in Pathology and Practical Chemistry, so that unnecessary repetition and duplication may be avoided.

The course of Hygiene, Public Health, and Preventive Medicine as thus remodelled and extended, will henceforth take rank as a full course, becoming one of the most prominent of the third year, a position to which it is fully entitled by its constantly increasing importance.

In concluding this short address, let me remind you, that we do not expect, even with our extended course and facilities, to make you expert Specialists in Sanitary Science, or to qualify you without further preparation to undertake the duties of Public Officers of Health; but we do expect of you that you will acquire a good knowledge of the principles of the Science, and a sufficient knowledge of its details, to become intelligent critics and safe advisers in all matters connected with Sanitary work.

